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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ashutosh Joshi

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ROACH BROWN MCCARTHY & GRUBER, P.C.

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WONG, EDNA

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/541,011	Applicant(s) JOSHI ET AL.	
	Examiner EDNA WONG	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2009 and 02 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-6,8 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-6,8 and 11-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

This is in response to the Amendment dated October 1, 2009 and Supplemental Amendment dated October 2, 2009. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Claim Rejections - 35 USC § 112

Claims **1, 4-6 and 8-16** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 1, 4-6 and 8-16 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

Claims **1, 4-6 and 8-16** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **CS 274995** ('995) in combination with **Parrish** (US Patent No. 6,793,903 B1) and **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

The rejection of claims 1, 4-6 and 8-16 under 35 U.S.C. 103(a) as being unpatentable over CS 274995 ('995) in combination with Parrish and Jen et al. has been withdrawn in view of Applicants' amendment.

Response to Amendment

Declaration

The declaration under 37 CFR 1.132 filed October 1, 2009 is sufficient to overcome the rejection of claims 1, 4-6 and 8-16 based upon specific references applied under 35 U.S.C. 103.

Claim Objections

Claim 1 is objected to because of the following informalities:

Claim 1

line 8, it is suggested that the word "to" be amended to the word -- at --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 1, 4-6, 8 and 11-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

line 2, it is unclear whether "a liquid aqueous biocidal mixtures" is singular or plural. The word "mixtures" should be amended to the word -- mixture --.

Claim 8

lines 2-3, “**said initial concentration** of magnesium oxide is from 10 to 50 ppm” lacks antecedent basis.

Antecedent basis must be laid for each recited element in a claim, typically, by introducing each element with the indefinite article (“a” or “an”). See *Slimfold Mfg. Co. v. Kincaid Properties, Inc.*, 626 F. Supp 493,495 (N.D. Ga. 1985), *aff’d*, 810 F.2d 1113 (Fed. Cir. 1987) (*citing* P. Rosenberg, 2 *Patent Law Fundamentals*’ § 14.06 (2d. Ed. 1984)). Subsequent mention of an element is to be modified by the definite article “the”, “said” or “the said,” thereby making the latter mention(s) of the element unequivocally referable to its earlier recitation.

Claim Rejections - 35 USC § 103

Claims **1, 4-6, 8 and 11-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **CS 274995** ('995) in combination with **Nakamura** (US Patent No. 6,194,821 B1) and **Jen et al.** (“Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography”, *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

CS '995 teaches a method for enhancing the generation of hydroxyl radicals (OH*) at ambient temperature (= maintained at 25°C) [page 7, line 18], in a liquid aqueous biocidal mixture (= an aqueous solution or wastewater of the complexation agents) [page 3, lines 17-18; and page 4, lines 6-7] containing hydrogen peroxide

(H₂O₂) wherein the hydrogen peroxide has an initial concentration (= adding hydrogen peroxide to the solution undergoing irradiation and bubbling in a concentration corresponding to a 1/10 molar concentration of the complex forming substances during the initial phase of degradation) [page 3, line 23 to page 4, line 2], comprising:

- (i) supplying oxygen (O₂) to said mixture (= the simultaneous bubbling through of air or O₂) [page 3, lines 20-21];
- (ii) supplying to said mixture a catalyst wherein the catalyst is supplied to the mixture at a concentration of from 2 ppm to 250 ppm (= in the presence of ions of iron, copper or nickel in the form of soluble inorganic salts in catalytic concentrations, i.e., at least 17 mg/liter) [page 3, lines 21-23];
- (iii) irradiating said mixture with UV light (= under UV-VIS radiation, which is emitted by an intermediate pressure Hg vapor lamp) [page 3, lines 17-20]; thereby providing a synergic combination of UV, H₂O₂ and O₂; and
- (iv) mixing said mixture (= active mixing of the solution) [page 3, lines 20-21; page 4, lines 13-15; and page 7, lines 15-16];

and wherein the generated hydroxyl radicals are accumulated in said mixture to reach a desired amount (= from H₂O₂ (hν) → 2 OH).

The oxygen is supplied by injecting air or oxygen into the mixture (= the simultaneous bubbling through of air or O₂) [page 3, lines 20-21].

The UV radiation has wavelength of from 190 to 390 nm (= UV irradiation) [page 3, lines 17-20].

The period lasts from 3 seconds to 5 hours (pages 4-7, Examples 1-10).

The period lasts from 30 second to 100 minutes (pages 6-8, Examples 4-10).

The method of CS '995 differs from the instant invention because CS '995 does not disclose the following:

a. Wherein the hydrogen peroxide has an initial concentration of from 2 to 250 ppm, as recited in claim **1**.

b. Wherein said initial concentration of hydrogen peroxide is from 10 to 50 ppm, as recited in claim **8**.

CS '995 teaches adding hydrogen peroxide to the solution undergoing irradiation and bubbling in a concentration corresponding to a 1/10 molar concentration of the complex forming substances during the initial phase of degradation (page 3, line 23 to page 4, line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the hydrogen peroxide described by CS '995 with wherein the hydrogen peroxide has an initial concentration of from 2 to 250 ppm; and wherein said initial concentration of hydrogen peroxide is from 10 to 50 ppm because the initial hydrogen peroxide concentration is a result-effective variable and one skilled in the art has the skill to calculate the initial hydrogen peroxide concentration that would have determined the success of the desired reaction to occur, e.g., the initial hydrogen peroxide concentration would have determined the concentration of the oxidative free

radicals formed (MPEP § 2141.03 and § 2144.05(II)(B)).

Furthermore, it has been held that changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed “critical” ranges and Applicant has the burden of proving such criticality; even though Applicant’s modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

c. Wherein the catalyst is an alkaline earth metal catalyst of suspended magnesium oxide, as recited in claim **1**.

d. Wherein the initial concentration of magnesium oxide is from 10 to 50 ppm, as recited in claim **8**.

CS ‘995 teaches irradiating the aqueous solutions of the complexation agents in the presence of ions of iron, copper or nickel in the form of soluble inorganic salts in catalytic concentrations, i.e., at least 17 mg/liter (page 3, lines 21-23).

Like CS ‘995, **Nakamura** teaches the photocatalytic degradation of organic

compounds (col. 2, lines 37-57). Nakamura teaches that:

As the catalyst gas 86 or powder, it is preferable to use that of titanium oxide, magnesium oxide or the like, and the titanium in the titanium oxide or the magnesium in the magnesium oxide attacks the bonded part of C-Cl in particular so that the bonded part of that is cut easily (col. 7, lines 1-5).

The UV light is irradiated from the excimer emission body 136 by the applying of the voltage of the suitable frequency between the inner electrode 35 and the metal container 162 so that UV light is emitted to the liquid 3. The metal container 162 acts as the outer electrode shown in FIG. 3 so that the applying of voltage between the metal container 162 and the inner electrode 35 generates the high frequency discharge to irradiate the UV light. **Although the UV light of wavelength of 222 nm or below is not generated the ozone in the liquid 3 or air, the UV light allows to generate the high reactive OH radical or O radical in the liquid 3. The radical cuts some bond of the organic compound so that the organic compound in the liquid 3 is decomposed efficiently to the decomposed material of CO₂, H₂O and so** (col. 9, lines 14-28).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst described by CS '995 with wherein the catalyst is an alkaline earth metal catalyst of suspended magnesium oxide because a magnesium oxide catalyst would have been functionally equivalent to a transition metal catalyst in the photocatalytic degradation of organic compounds as taught by Nakamura (col. 7, lines 1-5; and col. 9, lines 14-28).

It has been held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination (MPEP § 2144.06 and § 2144.07).

e. Adjusting the pH of said mixture to a value of from 7.2 to 9.7, as recited in claim 1.

CS '995 teaches an aqueous solution or wastewater of the complexation agents (page 3, lines 17-18; and page 4, lines 6-7).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because CS '995 teaches a similar liquid aqueous biocidal mixture as presently claimed. If the composition is physically the same, it must have the same properties. Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable (MPEP § 2112.01(II)).

f. Wherein the amount to be quantified by reacting said radicals with salicylic acid, as recited in claim **1**.

Jen teaches using liquid chromatography indirectly to detect hydroxyl radicals after a trapping reaction with salicylic acid in an advanced oxidation process (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the amount of the generated hydroxyl radicals described by CS '995 with wherein the amount to be quantified by reacting said radicals with salicylic acid because it is conventional in an advanced oxidation process to trap hydroxyl radicals using salicylic acid as taught by Jen (abstract).

g. Wherein the oxygen is supplied to saturation, as recited in claim **5**.

Nakamura teaches that:

The UV light is irradiated from the excimer emission body 136 by the applying of the voltage of the suitable frequency between the inner electrode 35 and the metal container 162 so that UV light is emitted to the liquid 3. The metal container 162 acts as the outer electrode shown in FIG. 3 so that the applying of voltage between the metal container 162 and the inner electrode 35 generates the high frequency discharge to irradiate the UV light. Although the UV light of wavelength of 222 nm or below is not generated the ozone in the liquid 3 or ***air, the UV light allows to generate the high reactive OH radical or O radical in the liquid 3. The radical cuts some bond of the organic compound so that the organic compound in the liquid 3 is decomposed efficiently to the decomposed material of CO₂, H₂O and so*** (col. 9, lines 14-28).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the oxygen described by CS '995 with wherein the the oxygen is supplied to saturation because the oxygen supplied is a result-effective variable and one skilled in the art has the skill to calculate the oxygen supplied that would have determined the success of the desired reaction to occur, e.g., irradiating the air with UV light would have generated highly reactive OH radicals or O radicals in the liquid wherein the radicals would had cut some bonds of the organic compound so that the organic compound in the liquid would have decomposed efficiently as taught by Nakamura (col. 9, lines 14-28) [MPEP §§ 2141.03 and 2144.05(II)(B)].

h. Wherein said mixing is carried out for a period of time sufficient to generate the desired amount of radicals, as recited in claim **11**.

i. Wherein said desired amount of radicals is an amount sufficient to reach a required biocidal effect in the mixture, as recited in claim **12**.

j. Wherein said desired amount of radicals is a predetermined quantity, as recited in claim **16**.

CS '995 teaches an active mixing of the solution (page 3, lines 20-21; page 4, lines 13-15; and page 7, lines 16-17).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because:

(i) The active mixing of the solution disclosed by CS '995 would have inherently been carried out for a period of time. There is no reason why this period of time is not sufficient to generate the desired amount of radicals, and wherein the amount is an amount sufficient to reach a required biocidal effect in the mixture, and is a predetermined quantity.

(ii) The mixing period of time is a result-effective variable and one having ordinary skill in the art has the skill to calculate the mixing period of time that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05(II)(B)).

(iii) Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

k. Wherein said period lasts more than 5 hours, as recited in claim **15**.

CS '995 teaches an active mixing of the solution (page 3, lines 20-21; page 4, lines 13-15; and page 7, lines 16-17). The active mixing of the solution disclosed by CS '995 would have inherently been carried out for a period of time.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the mixing period of time described by CS '995 with wherein said period lasts more than 5 hours because the mixing period of time is a result-effective variable and one having ordinary skill in the art has the skill to calculate the mixing period of time that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05(II)(B)).

Furthermore, the mixing period of time is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
November 20, 2009